ORIGINAL ARTICLE

A Prospective Evaluation of the Management and Outcome of Traumatic Posterior Dislocation of the Hip-A Preliminary Report

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Abstract

Introduction: *Traumatic posterior dislocation of the hip(TPDH) is considered an absolute orthopeadic emergency and the outcome of management and prognosis is time dependent. The optimum time within which reduction should be achieved to yield excellent result has remained an issue of considerable controversy. In this paper we evaluated the influence of interval between injury and reduction of dislocation on the choice and outcome of management of TPDH.*

Method: *This is a five year prospective and multicenter study in North-central Nigeria.*

Patients and methods: Patients with TPDH, who were treated and had a minimum follow up of 24 months, were included in this study. Reduction was achieved under general anaesthsia. Outcome of treatment was evaluated using the clinical criteria proposed by Matta.

Results: Forty-seven patients were evaluated comprising 36(76.6%) males and 11(23.4%) females. The commonest cause of injury was road traffic accident in 40(85.1%). Presentation was considered as early if patient presented within 6 hours of injury and late if later than this. Using Thompson and Epstein's (TE) classification of posterior dislocation of the and Pipkin's (P) sub-classification of type 5, there were 10TE1; 25TE2; 9TE3; 2TE4 and 1 TE5P2. TE1 and TE2 make up 74.5% of cases. 32(68.1%) presented early and 15(31.9%) late. Thirty nine patients had successful closed reduction comprising 32 that presented early and seven late. The mean interval between injury and reduction was 9.7(±1.2) hours. Two (4.3%) patients were reduced within 6hours, 32 (68.1%) were reduced within 7-12hours. Five patients had open reduction and three had salvage Girdlestone .pseudo-arthroplasty. Outcome assessment showed in the closed reduction group, 22 (59.5%) had excellent score, and 11(29.7%) had good. These patients were all reduced within 12hours. Two each had fair and poor outcome while two were lost to follow up. Seventeen (36.2%) developed complications comprising 12 (70.6%) who presented late and five (29.4%) who came in early. The commonest complication was avascular necrosis of the femoral head in eight (47.1%), all presented late with intractable pain; eight (47.1%) with pain of unknown origin and one (5.8%) with sciatic nerve injury which resolved on conservative management.

Conclusion: *Reduction of PDH within 12 hours is associated with excellent results and few minor complications.*

Key words: *Traumatic posterior dislocation of the hip, time of reduction, complications*

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Introduction

Traumatic dislocation of the hip is a severe injury considered as an absolute orthopaedic emergency.[1, 2] The incidence is steadily rising because of increasing motor vehicular accidents.[1-3] Although isolated hip dislocations are common, most of the cases are associated with fractures of the acetabulum[3] which ultimately influence the choice of treatment modality and the final outcome and prognosis.[3-6] The optimum time for relocation of the dislocated hip with excellent results has remained an issue of considerable controversy. Hougaard and Thompson[7] found that 88 of their 127 patients had excellent or good results when reduced within 6 hours compared to 42 when reduction was achieved thereafter. On the other hand, Upadhyay et al[8] found that despite early reduction within 6 hours, 24% of the patients in their series developed osteo-arthritis on long term follow up. Schwartzkopf et al[9] also found that despite early reduction of isolated hip dislocation, only 14 out of 30 hips had excellent or good results while the rest developed various complications. They concluded that the type of dislocation, the overall injury severity and the age at the time of injury were more important prognostic factors than interval between injury and relocation. Recently, Bhandari [5]opined from their analysis that the quality of reduction was the only predictive factor of clinical and radiological outcome and concluded that, indeed, interval to reduction may be less important than previously described. Despite all these there is a general consensus that early recognition,

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gentle, prompt and stable reduction within 12 hours is generally believed to be satisfactory with excellent results expected.[1,4,9,10]

In this study, we prospectively evaluated the influence of time of dislocation on the subsequent choice of treatment and outcome of posterior dislocation of hip in North Central Nigeria.

PATIENTS AND METHODS

This a five year (2000-2005) prospectively study carried out in three centers namely Federal Medical Center Gombe, Gombe state(FMCG); Bauchi Specialist Hospital, Bauchi (BSSH) and Jos University Teaching Hospital, Jos (JUTH).

Patients who presented to the emergency room with posterior dislocation of the hip were recruited into the study. Patients who discharged themselves against medical advice; transferred to other centers or lost to follow-up in the required minimum period of follow up were excluded from the study.

At presentation, personal data, details of the accident including the type of vehicle, time of injury, initial first aid, and associated injuries were documented. Other indices included interval between presentation and intervention and other surgical procedures. Closed reduction was undertaken under full general anaesthesia in theater.

In patients with isolated posterior dislocation, successful closed reduction was followed by three weeks of fixed skin traction and three weeks of partial weight bearing with bilateral axillary crutches. In patients with fracture dislocations, skin traction or skeletal traction was applied for six weeks followed by six weeks of mobilization with crutches non-weight bearing on the affected hip.

Patients that presented with unreduced posterior hip dislocation longer than eight weeks were counseled for open reduction while those who presented with evidence of avascular necrosis were considered and had Girdlestone pseudoarthroplasty as their initial treatment option. All open procedures were done using the posterior southern approach, followed by six weeks of traction.

Outcome assessment was done using the criteria proposed by Matta.[10] This was found to be much easier to apply and readily reproducible by the resident doctors. Complications were documented as they developed during the out-patient follow-up clinics. Minimum follow-up period was 24 completed months. Follow-up was difficult as several visits and phone calls were made to get patients who considered themselves already healed, to come to hospital for evaluation.

Patients are said to present early, if the interval between injury and presentation to the hospital for treatment was less than or equal to six hours.

Early reduction was defined as the interval between injury and the operative reduction under anaesthesia less than or equal to six hours. Intervals greater than six hours are considered late.

Reduction was considered stable only if the hip remained reduced in all range of motion.

Duration of hospitalization is the interval between admission and discharge expressed in days.

Data analysis was done using Epi-info statistical software version 6.2 of 2002. Data were expressed as means with standard deviation. All calculations were done to the nearest hundredth.

RESULTS

Fifty four patients presented during this period and only 47 fulfilled the inclusion criteria and were analyzed in this study. This comprises twenty-six (55.3%) from JUTH; sixteen (34.0%) from FMCG and five (10.6%) from BSSH.

There were 36(76.6%) males and 11(23.4%) females. The commonest age group was 30-39 with 23 (48.9%) patients. Thirty-eight (80.8%) were under 40 years. The mean age was 32.4 (±9.7; range 17-65) years.

The commonest source of injury was road traffic accident. This comprised 40 (85.1%) cases due to car or truck accidents, six (12.8%) due to motorcycle mishaps and one (2.1%) from a fall at home. The right hip was involved in 29 (61.7%) cases and the left in 18 (38.3%).

Thirty-two (68.1%) patients presented early with a mean time of 5.12 (±0.9) hours, their mean injury severity score (ISS) was 20.0 (±8) while 15 (31.9%) presented late in a mean time of 1683.8 (±1889) hours with a mean ISS of 9.0 (±8).

Posterior dislocation was classified on plain X-rays using Thompson-Epstein (TE1-4) and associated femoral head fracture using Pipkin (TE5P1-6). In this study, there were 10 TE1; 25 TE2; 9 TE3; 2 TE4 and 1 TE5P2. TE1 and TE2 make up 74.5% of all the cases. The distribution of this is shown in table I.

Table I. Radiological types of posterior dislocation of the hip

Table I. Radiological types of posterior dislocation of the hip

Type	Early (n=32)	Late (n=15)	Total	%
TE1	8	2	10	21.3
TEII	16	9	25	53.2
TEIII	6	3	9	19.2
TEIV	1	1	2	4.2
TEV P2	1	0	1	2.1
	32	15	47	100

TE- Thompson and Epstein

P2 - Pipkins sub -classification of TE5

Table II: Methods of treatment

Method	Number of patients (n=47) Early presentation	Late presentation	Total	%
Closed reduction	32	7	39	83.0
Open reduction	0	5	5	10.6
Girdlestone	-	3	3	6.4
	32	15	47	100.0

Table III: Duration between injury and reduction of dislocation

Time interval (hours)	Number of patients	%
≤ 6	2	4.3
7-12	32	68.1
13-18	4	8.5
19-24	1	2.1
≥ 24	8	17.0
Total	**47**	**100**

Thirty-nine (83.0%) patients had successful closed reduction. All the thirty-two (68.1%) patients that presented early were successfully reduced while only seven of the late presenters could be reduced closed as shown in table II. The mean interval between injury and reduction was 9.7 (±1.2) hours. Only 2(4.3%) were reduced within 6 hours while 32 (68.1%) were reduced within 7-12 hours of injury. The details are shown in table III. Five (10.6%) had open reduction and three (6.4%) had salvage Girdlestone pseudo-arthroplasty. These patients all presented late.

At two years,41 patients were evaluated, two (4.9%) had reduction <6hrs; 30 (73.2%) at 7- 12hrs; five (12.2%) at 13-18hrs and four (9.8%) after 24hrs; one died from unrelated illness, two relocated to Lagos, South-West, Nigeria, and three that had salvage Girdlestone were not considered further for this study as they all had pseudoarthroplasty. The outcome assessment depending on the time of reduction shows that 22 patients who had excellent outcome were reduced in a time of 12hrs and less while fair or poor outcome was observed in patients who had open reduction. In the closed reduction group, 22(59.5%) had excellent score while 11(29.7%) had good score. These are shown in tables IV and V.

Table IV: Outcome assessment depending on the time of reduction

	Excellent	Good	Fair	Poor
<6hrs	2	-	-	-
7-12hrs	20	10	-	-
13-18hrs	-	1	2	2
19-24hrs	-	-	-	-
>24hrs	-	-	2	2
Total (n=41)	22	11	4	4

Table V: Outcome data (Matta)

Score	Closed reduction (n=37)	Open reduction (n=4)	Girdlestone (n=3)
Excellent (18)	22(59.5%)	-	-
Good (15-17)	11(29.7%)	-	-
Fair (13-14)	2 (5.4%)	2 (50%)	-
Poor (<13)	2 (5.4%)	2 (50%)	-

Seventeen (36.2%) patients developed complications while 30(63.8%) had none at a mean follow up of 2 (range 1.9- 4) years. This comprised 12 (70.6%) who presented late while five (29.4%) presented early to the hospital for treatment. The commonest complication was avascular necrosis of the femoral head in eight (47.1%) patients. There were 2 of stage 2 and 6 of stage 3 using Ficat and Arlet's [22]staging criteria for avascular necrosis of the femoral head. Eight (47.1%) had pain of unknown origin, five of these were those that presented early and were reduced within 12 hours and one (5.8%) had sciatic nerve palsy which resolved after nine weeks post-reduction.

All the eight patients that developed avascular necrosis of the femoral head presented late and all had intractable pain and one had sciatic nerve palsy post open reduction of an old neglected hip dislocation.

Discussion

In this study, we made two main observations. Firstly, reduction of the dislocated hip within 12 hours is associated with good results in the majority of cases. Thirty-two (78%) who fell into this category had excellent (2 patients) and good (30patients) outcome assessments at two years of follow up. This is similar to the findings of Brav[11], Hougaard and Thomsen[7]. More recently however, studies by Bhandari et al [5], Upadhyay et al [8] and Schwarzkopf et al [9] seem to suggest that time of reduction is not as important as previously thought but rather the quality of reduction is a more important factor in the long term outcome in patients with posterior dislocation of the hip.

While the controversy lasts and no consensus on the optimal time of reduction for perfect outcome, there are certainly more complications following delayed reduction. In this series, the complication rate was 36.2% (17 patients). Twelve (70.6%) of these had late reduction.

Avascular necrosis of the femoral head is the commonest and most severe complication in 8(53.3%) of late reductions. None of the patients that were reduced within 12hours presented at follow-up with clinical and plain radiographic signs of necrosis. The incidence has been similarly shown to be closely related to the interval between injury and relocation of the dislocated hip.[2,11-14] Brav[11] demonstrated in his series, in which reduction of dislocated hip was achieved within 12 hours, only 17.6% developed avascular necrosis of the femoral head compared to 56.9% when achieved after 12 hours. Similarly, Hougaard and Thomsen[12] showed that the incidence of avascular necrosis increased from 4.8% to 58.8% if reduction is done after 6 hours.

Eight (53.3%) patients presented with pain in the affected hips for which we could not identify any cause. A CT scan or MRI could have assisted us in diagnosis of this pain but we neither had the facilities at the centers of study nor could the patients afford them on account of cost and proximity. The average cost of CT scan and MRI was N35, 0000.00 and N61, 000.00 respectively during the period under review. We think this may be the first step in the evolution of avascular necrosis or post-traumatic osteoarthritis in these patients.

One (5.8%) patient had sciatic nerve palsy as a direct consequence of the dislocation but resolved following reduction. The incidence of sciatic nerve injury is approximately 10% in adults and 5% in children usually resulting from laceration, stretch, compression or trapping of the nerve in heterotopic ossification.[15] This is more common in patients with fracture-dislocation compared to isolated dislocation [4, 15, 16] and those with neglected dislocation requiring open reduction.[6] Hillyard and Fox [17] observed ,however, in their series that transfer of patient from one hospital to another is a more import factor associated with incidence of sciatic nerve injury and not associated fracture dislocation as often thought of . This increases the length of time the hip remains dislocated.

Post traumatic osteoarthritis is another common complication [2,3,8,13,14,18,19] with rates ranging from 8.3% to 35.0% This is commonest in patients that have fracture dislocation [3,20] and least in patients who have isolated dislocation. [19, 20] None of the patients in our study had developed osteoarthritis as at time of this report. We think the duration of our follow up, which ranged from 2-4 years, is still short for those who will develop this complication. Barring the difficulties we have experienced so far with poor follow-up amongst our patients, we hope to publish the outcome of our long term follow-up study.

Similarly, no patient developed heterotopic ossification [4,6,16,19] with research data ranging from 1.2%-9.3%.

Secondly, early presentation for treatment made reduction easier, less traumatic and associated with less morbidity. All the patients who presented within 24hours had successful closed reduction. Similar observations were made by previous reports. [6,10] Eight (53.3%) of the patients that presented after 24 hours had operative reduction, three of which had salvage Girdlestone pseudo-arthroplasty. These were more traumatic, associated with greater morbidity and were far more expensive compared to closed reduction. The indications for open reduction nowadays seem to be instability after closed reduction [6, 10,21,22], failure of closed reduction due to intra-articular fragment or soft tissue interposition or sciatic nerve palsy[6,10] and primary arthroplasty[21] depending on the degree of associated acetabular fractures. It is unusual that a dislocation will present for orthodox treatment for the first time after a mean period of 28days (range 10-77days) in the more developed countries of the world as we found in our series. A report by Hoiness et al [23] of a successful reduction of dislocation after 5 months is the exception rather than the rule.

In summary, dislocation of the hip is a severe injury and the outcome is excellent if reduction is carried out within 12 hours of injury and isolated without associated acetabular fractures. The complications in the short term are similarly few, minor and easy to treat. Medical education on presentation for orthodox treatment in

hospitals remains a useful way of reducing cases of unreduced neglected hip dislocation.

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Appendix 1: Clinical criteria proposed by Matta

PAIN	
None	**6**
Slight/intermittent pain	**5**
After walking but resolves	**4**
Moderate but able to walk	**3**
Severe, prevents walking	**2**
WALKING	
Normal	**6**
No cane but slight limp	**5**
Long distance with cane/crutch	**4**
Limited even with support	**3**
Very limited	**2**
Unable to walk	**1**
RANGE OF MOTION (%)	
95-100%	**6**
80-94	**5**
70-79	**4**
60-69	**3**
50-59	**2**
<50	**1**

Score	**Excellent**	**18**
	Good	**15-17**
	Fair	**13-14**
	Poor	**<13**